

Draft Prospectus

Monitoring Habitats and Wildlife in the Southern Cascade Ecological Unit in Northern California

Background

In 2001, personnel from the Northern California North Coast Region (NCNCR) wildlife programs branch developed a plan to assess forest habitat conditions and conduct wildlife inventories at sample points in the Southern Cascades ecological province. Based on literature reviews, techniques were developed to assess several wildlife species groups and inventory habitats using California Wildlife Habitat Relationships (CWHR) classifications and methods.

Information Services Branch personnel assisted in developing procedures for selecting and locating random sample plots using a 3 mile ArcView grid distributed across the study area. In 2001, habitat and wildlife data were collected from twenty sample areas to assess the feasibility and effort needed to conduct the surveys. In 2002, 6 seasonal field technicians were hired to expand the project. Sixty three plots were surveyed to describe habitat conditions, document the presence of breeding birds and assess the relative abundance of small/midsize mammals. The presence/absence of 22 CWHR habitat elements and the density of 14 additional habitat elements were measured.

The work described above was conducted to evaluate the feasibility of developing an inventory and long term monitoring project that would provide continuous information to guide biologists, land managers and the public in decisions regarding management of forest and rangeland habitats.

Relevance to conservation

It is the mission of the California Department of Fish and Game to “*manage the States’ diverse fish, wildlife and plant resources and the habitats upon which they depend for their ecological value and enjoyment by the public*”. Achieving our mission is dependant on an understanding of the status of habitats and wildlife in the State as well as monitoring temporal changes in these resources.

Prior to the mid-nineteenth century, fire was a major ecological force in determining the patterns of spatial and temporal forest structure and plant species composition of western coniferous biomes. (Agee, 1998). Uninterrupted, relatively frequent fire return intervals maintained stands of conifers consisting of clumped, larger trees and more open canopies that exist in today’s forests following decades of fire suppression. (Agee, 1994, Avery et. al, 1976, Hessburg, et al 1994, Johnson 1994, Weaver 1943, Harrod, et al 1999, Minnich et al 1994.)

The persuasive evidence of closing canopies throughout California's forested habitats during the last century suggests that primary energy production in forest ecosystems is shifting from herbaceous and shrubby vegetation to trees. The loss of understory shrubs, forbs and grasses as tree canopy closes is supported by inverse relationships between tree crown density and forage. (Pace 1958, McConnell et al. 1965, Jamison 1965 and Miller et al. 2000). Shrubs, grasses and forbs are essential habitat elements for many species within forest ecosystems, either as structural elements for reproduction and cover or as direct energy sources for primary consumers providing trophic pathways to carnivores. Thus, the redirection of energy flow from the predator chain through parasitic and saprophytic pathways is leading to increases in decomposers and dead organic matter with fewer herbivores and carnivores.(Odum, 1960).

As the population of California continues to increase, the Department must continue its' efforts to conserve resources in the face of the visible and rapidly increasing loss of habitats to rural and urban development. We cannot however, fail to recognize and understand the consequences of reduced habitat suitability across vast landscapes that appear to be "protected" but in fact may be in various stages of functional decline due to disruptions of basic ecological function.

The Departments' trustee responsibility for wildlife conservation takes place in increasingly complicated, political and judicial environments. Resource management has entered a challenging era resulting from increased conflicts between user groups and has provided a new setting for forest and range policy decisions. Pressure continues to increase for complex land use planning decisions. The Department owes its constituents and decision makers scientifically based help in understanding the long term consequences of their actions and decisions.

The Department's trustee responsibility cannot be achieved by focusing on a relatively few species of wildlife, habitats or habitat conditions that are suspected of being in decline. Managing an area for a sensitive or indicator species may preserve only those environmental conditions needed by that species, ignoring the ecological processes and resources needed by other species (Kushlan 1979). "Community based approaches should be used when the quality or integrity of a habitat or community is of concern, with data collected on attributes of community structure and on processes such as nutrient cycling, primary and secondary production and the factors regulating these processes." (Landres et al. 1983). Making land management decisions based on information gathered for a limited number of species may not provide suitable conditions for numerous other species. For example, some species require a combination of habitat types in certain proportions and spatial arrays (Forman and Godron 1981; Pickett and White 1985). Numerous authors have recommended that research be directed toward developing an overall strategy for monitoring wildlife that accounts for natural variability in population attributes and that incorporates concepts from landscape ecology (Risser et al. 1984; Forman and Godron 1986; Noss and Harris 1986; Urban et al. 1987). Accepting status quo indices (indicator species) with attendant limitations may preclude agencies from adequately assessing the ecological integrity of natural systems and recommending effective management actions (Landres et al. 1983).

This proposal would establish a program designed to continuously monitor terrestrial habitat conditions and a variety of vertebrate species associated with both primary and secondary consumer trophic levels. We propose to use repeated measure techniques to assess temporal and spatial changes in the relative abundance of important habitat features (elements) and associated wildlife. Habitat assessment replicates would be done at relatively wide intervals (e.g. every five years) and wildlife surveys for most species with high temporal variability would be conducted annually.

This approach to resource assessment does not attempt to replace our need to understand the contemporary and future status of rare species and habitats. Strategies to assess ecological conditions over landscapes are not likely to provide predictive inferences about rare resources. Such strategies can, however, produce a comprehensive process that systematically identifies ecological scarcity thereby providing a scientific basis for focused, single species research and conservation strategies.

Californians will face many difficult choices as population increases and priorities change. Paramount among these, are decisions to guide the development, use, and protection of the state's lands and wildlife resources. A long-term systematic effort is required to move beyond narrowly focused problem assessments. This is the purpose and the objective of this proposal - to take the initial steps towards developing a base of reliable knowledge that continues to grow and guide the Department and other public and private resource management entities towards successful conservation.

Objectives

To develop a scientifically based habitat and wildlife monitoring system that will inform employees and our constituents as we strive to fulfill the Department's mission.

To achieve this, the project goals are to:

- Describe the current abundance, distribution and condition of habitat types and stages;
- Determine the current abundance and distribution of CWHR habitat elements;.
- Determine the trends in abundance, distribution and condition of habitats, elements and wildlife species through time.

Methods:

Study area and geographic scale.

- The initial study will take place throughout the Southern Cascades Ecological Province as defined by the United States Department of Agriculture, Forest Service and Natural Resource Conservation Service, "The Ecological Units of California" August, 1994. The Province is approximately 6.4 million acres and consists of 15 ecologically distinct sub units.

General description of study and sampling design

- Habitat data will be gathered from randomly located sample sites consisting of a four-plot grid.
- Small mammal traps will be set in sixteen, 4-trap grids at random locations within the sample plot grid.
- Breeding birds will be monitored in each grid using recording devices.
- Baited, remotely triggered cameras will be set at each survey site.
- Reptiles and amphibians will be monitored using time/area search techniques
- Species occurrence of bats will be surveyed at each plot using anabat detection equipment.
- Eight digital habitat photographs are taken at each sample site.

Equipment.

- Vehicles are currently available.
- Most equipment is available including, small mammal traps, remote cameras, habitat survey equipment e.g. compass, tapes, digital cameras, bird recorders and bat detection equipment.
- Minor amounts of annual replacement of small items needed e.g. bait, flagging, recorder tapes, batteries and film.

Duration of project.

- The project is intended to be continuing as part of an annual assessment of habitat and wildlife population changes over time.

Data management

Data has been stored in NCNCR Information Services Branch office and at Wildlife and Habitat Data Analysis Branch.

- Information is currently available in a developing intra-agency website.
- Archived information includes:
 - digital photographs for each sample grid.
 - habitat variables for each plot and each grid.

small mammal trapping results.

baited camera results with scanned photographs of species observed.

- Bird recordings are being assessed and species identifications will be entered into the database when completed. All data will be stored and accessible from data query options in Microsoft Access.

Products and estimated dates of completion.

Anticipated products include website access to query tools allowing :

- Trend assessments by habitat features including, tree size (dbh), crown canopy, ground cover, and CWHR vegetative habitat element occurrence.
- Replicated photographs of each sample plot grid providing visual assessments of temporal habitat changes.
- Population trend assessments of nesting bird species, and small and medium mammals.
- Evaluations of wildlife species associations with CWHR habitat, types, size and cover classes (CWHR program validations.)
- Long term, systematic development of wildlife species distributions based on spatial analysis of wildlife observations.

Estimated dates of completion.

- Surveys will be conducted each year from late May through early September. All monitoring results will be entered into NCNCR website database by data entry personnel weekly during the field season. All data will be provided to Wildlife and Habitat Data Analysis Branch at the end of the field season, each year.
- A report will be prepared and provided to Resource Assessment Program annually..
- The project is proposed as a continuous, ongoing activity designed to provide information to help guide the Department and other public and private land and resource management entities in conservation planning. A final project report is not applicable.

Kinds of data that will be available at Wildlife and Habitat Data Analysis Branch.

- GIS based maps with sampling grid and locations (coordinates) of each plot sampled.
- Eight digital photographs at each plot grid replicated every five years.
- Habitat descriptive data at each plot-grid including:
 - a. ground cover description at 100 random points
 - b. diameter at breast height of 100 trees (in tree types).

- c. tree canopy closure (hit or miss) data from site tube at 100 points.
- d. tree species identification for 100 trees per plot grid.
- e. crown decadence and form class of shrubs and herbaceous plants.
- f. presence or absence of twenty-one CWHR habitat elements.
- g. density estimates for twelve classes of snags and logs on plots.
- h. description of CWHR habitat type, size and cover class for each survey plot.

- Wildlife data at each plot-grid includes:

- a. records of breeding birds identified at each plot during multiple recording periods with data query programs allowing assessment of population trends and distribution patterns by species and habitat associations.
- b. records of small mammals captured at each plot with analysis tools to assess population trends, distributions and associations with habitats.
- c. scanned photographs of species observed at baited camera stations with species identification record and query programs enabling assessment of population status by species.
- d. records of bats occurrence using Anabat equipment. Query programs will be developed to allow assessment of population status, distributions and associations with habitat elements.
- d) records of reptiles and amphibians observed during plot surveys. Query programs will enable assessment of demographics and habitat associations.

- Potential data outputs:

Microsoft Access programs will be developed to allow users to conduct a wide variety of data queries providing understanding of wildlife and habitat conditions and trends.

- Identify likely scientific publications.

Data archives will provide extensive opportunities to conduct research involving relationships between habitats and wildlife. Examples include:

- Temporal and spatial assessments of change in habitat conditions and habitat elements relating to succession, natural disturbance or forest management activities.
- Relating trends in wildlife populations to changes in habitat types, size and age classes.
- Validation studies of CWHR species/habitat models.

Collaborators:

Project lead during the first full season of data collection was from NCNCR wildlife programs personnel under direction of the regional manager and assistance and guidance from Resource Assessment Program (RAP) staff.

Seasonal field employees were hired with direction from RAP staff through funding provided by the Department to the California State University of Sacramento, Hornet Foundation.

Technical assistance was provided by NCNCR Information Services Branch (ISB) personnel in Redding. This work included development of plot sampling procedures, GPS training and development of data entry, storage and retrieval procedures. ISB personnel are developing a website that currently allows access to data gathered during 2002. All available information gathered in 2002, has been provided to the Wildlife and Habitat Data Analysis Branch.

Breeding bird survey data (tape recordings) have been given to volunteers, skilled at bird call identification. Species identification data will be recorded and available in the database. This work is not yet completed.

Personnel from NCNCR Wildlife Programs Branch and Information Services Branch have corresponded with representatives from the Museum of Natural History at the University of California at Berkely. Museum personnel have expressed interest in the project and a symposium has been planned to present the project and share information. Assistance in species identification training and technical review will be discussed.

NCNCR and seasonal field personnel met with California State Department of Health Services (Disease Section Personnel) to receive safety training on hantavirus prevention and small mammal species identification. Health Services personnel have an extensive small mammal specimen collection and have offered access and assistance in species identification. Small mammal data will be provided to this agency.

Meetings were held with private timber companies to present the program and discuss access to private property and sharing of data. All but two companies provided permission to access company lands. The uncommitted companies are considering the issue.

The US Forest Service has been presented with details of the program including methods and objectives. The Forest Service provided summer housing for field personnel and expressed interest in becoming involved if the project continues.

NCNCR personnel plan to solicit help from the USFS during the upcoming field season.

California Department of Forestry and Fire Protection provided housing for personnel during the 2002 field season. Survey data was collected at Latour State Forest and will be provided to CDF.

Personnel Requirements and Funding from CDFG:

Six seasonal employees were hired during the field season (June through August) of 2002. Funding was provided by CDFG. Vehicles and most equipment have been purchased and are currently available to the Resource Assessment Program.

Plans are being made to hire ten seasonal employees through the Wildlife Health Center at University of California, Davis for the 2003 field season. The work completed in 2002 was done in forested habitats in the Southern Cascade Province. Because of increasing concerns relating to ecological issues in the great basin region, we request four additional personnel to begin work in Modoc Plateau region.

All new employees, including DFG personnel will be trained in field sampling techniques. All employees will receive training in safety, GPS procedures, species identification and safe handling of small mammals.

Issues to be resolved:

Permission to enter private timber company lands that have not yet authorized entry.

Formal technical review of survey methods and techniques including statistical review of power analysis.

Further coordination with USFS personnel to solicit formal collaboration.

Public access to data gathered on private timber company lands that are stored in Department of Fish and Game websites.

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